

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

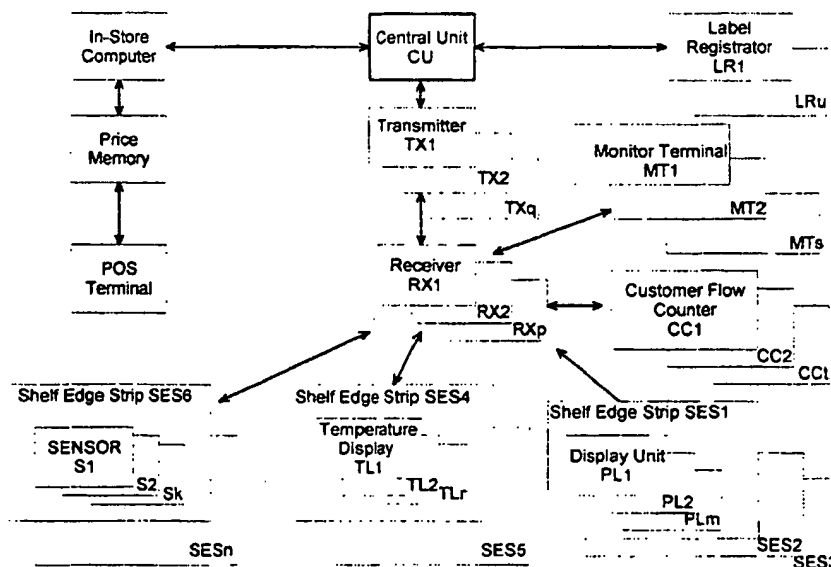
(51) International Patent Classification 5 : <b>G06F 15/21, G07G 1/14, A47F 10/02, G01K 1/02</b>	<b>A1</b>	(11) International Publication Number: <b>WO 94/29802</b>
		(43) International Publication Date: <b>22 December 1994 (22.12.94)</b>

(21) International Application Number: **PCT/SE94/00269**(22) International Filing Date: **25 March 1994 (25.03.94)**(30) Priority Data:  
**9301102-1** **2 April 1993 (02.04.93)** **SE**(71) Applicant: **3i SYSTEMS AB [SE/SE]; Nyponvägen 14, S-691 47 Karlskoga (SE).**(72) Inventor: **ANDERSSON, Hans; Systerstigen 13, S-691 40 Karlskoga (SE).**(74) Agent: **ERI-KONSULT; Rågvägen 12, S-691 42 Karlskoga (SE).**(81) Designated States: **FI, NO, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).****Published***With international search report.**In English translation (filed in Swedish).*(54) Title: **INFORMATION SYSTEM FOR SHOPS**

## (57) Abstract

The invention relates to an information system preferably intended to collect, present and report back information in stores, shops, stocks etc., incorporating preferably one or a plurality of information sensors in the form of sensors for different purposes and information displays in the form of display units and/or computer monitors with information possible to change or search and where this system is permanently connected to the in-store computer. The Sensors ( $S_1 - S_k$ ) can consist of sensors for temperature, gas, customer flow, or give geometrical or other information concerning shelves, set of shelf systems or other equipment installed in the shop. The displays, which can consist of Display Units ( $PL_1 - PL_m$ ), ( $TL_1 - TL_r$ ) or of computer terminals

with Monitors ( $MT_1 - MT_s$ ), are in the same way as the various sensors via one or a plurality of Receivers ( $RX_1 - RX_p$ ), parts of the half-duplex communication system, in contact with one or a plurality of Transmitters ( $TX_1 - TX_q$ ) which in turn are connected to a Central Unit (CU). The central unit in its turn is connected to or forms an integrated part of the in-store computer system. The displays, Display Units as well as the Monitors, are in this way continuously possible to change from the Central Unit on demand of the in-store computer system and the system supervises and compares by these means continuously the information presented at the displays with the one stored in the in-store computer and, at a discrepancy between these, emits a list of "measures to take".



BEST AVAILABLE COPY

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

## Title: INFORMATION SYSTEM FOR SHOPS

This presented invention relates to an information system for stores, shops, stocks etc. preferably intended to gather, collect, report back and present information concerning goods and items of merchandise incorporating one or a plurality of information sensors and one or a plurality of information displays, the latter of which where the information is possible to change, via connections to one or a plurality of receivers, which in turn, are connected via wire or wireless transmission to one or a plurality of transmitters which, initiated from a Central Unit, are arranged to transmit current information. The information transmitted is primarily based upon information at the in-store computer and consists of the items of merchandise and changes of these (as to assortment or price) and are transmitted to the Central Unit via a permanent electrical or optoelectronic connection or, where relevant, the Central Unit forms an integrated part of the in-store computer.

The information displays consist partly of Display Units and Display Boards partly of computer terminal Monitors. The Display Units are primarily mounted on or in close connection to sets of shelves for items of merchandise or deep-freeze benches/shelves for ready made food for presentation of prices or temperatures, as separately located price boards for presentation of prices for certain groups of items of merchandise or to inform of temporary or permanent changes of assortment of items or of special offers.

The Monitor terminals are primarily according to the invention to be utilized in conjunction with the information system and the related data base, with information on article number, location, packet and available space on shelves, in order to facilitate search for current items and in doing so get information about the physical location of the items within the shop area.

Computer monitored electronic systems for price information incorporating a number of information displays in the form of displays arranged at the edge of the shelves in stores or stocks are already known. These displays show  
5 the desired information as price, article number/ ordering number and the denomination of the item of merchandise.

Alteration of especially the price information presented is performed by one to the in-store computer connected  
10 transmitter which relays the current information via e.g. wireless transmission to receivers in connection to the displays. Such electronic retail price information systems are presented in e.g. Swedish Pat. SE-441 447 and U.S. Pat. 4,521,677.

15 The information transfer in such systems is normally a one-way transfer which means that the information is transferred from the in-store computer to the receiver/ the displays. It is however also known to arrange a bi-  
20 directional information transfer between the in-store computer and the displays. This is e.g. shown in Swedish Pat. SE-89.0472-9. In this specific case the retail price information system incorporates a separate computer connected to a communication unit which wirelessly transmits the  
25 information introduced to the computer to the various displays. When a display has received its designated message a response signal is sent back to the communication unit. The receipt of the price change information is in this way confirmed.

30 These earlier retail price information systems with bi-directional communication, however, give no information on whether the information presented at the various displays is in accordance with the information at the in-store  
35 computer or not. There is, however, more recently been published a patent, U.S. 4,821,291, which solves this weakness by means of sending back the earlier received information a short fixed period of time  $T_1$  after the

reception of the information. The information stored at the display is, however, checked only at this occasion and any continuous supervision of the information of all displays is not possible due to time limitations as a consequence of  
5 the very limited communication band width.

A patent application for a system which overrides these limitations has lately been done, Swedish patent applications no 9103603-8 and 9201632-8, where the application is defined  
10 to the use of displays for price indication respectively temperature indication / temperature registration in shops.

This invention is connected to and includes these two applications mentioned above at the same time as it widens  
15 the application area by including arrangements for localizing where items of merchandise are placed in the actual shop, how much space an item occupies at the designated localization and also gives the possibility of counting and recording to which extent the customers are passing the  
20 chosen localization. The invention also makes it possible, through the use of terminal monitors connected to the system, to present the localization of an item of merchandise on a simple sketch-map showing the saleroom and inform about the set of shelf section and the shelf. The invention also  
25 incorporates other alarm functions which like temperature monitoring / alarm can be used to alarm internal personnel as well as external, and includes sensors for freon , smoke from a fire or something similar.

30 The shelf edge mounted displays applied for in patent application no 9103603-8 have been added with assemblies of displays for groups of items of merchandise, large displays for items of merchandise exhibited on special pallets and the fact that the displays even can be utilized for  
35 information about availability or other information on an item of merchandise as e.g. "SOLD OUT".

The intention with this invention is thus to create a communication system with high transmission capacity for duplex operation in shops, stores etc., direct-connected to the in-store computer and its data bases in order to  
5 facilitate and guarantee in this way that correct information concerning items of merchandise, products and equipment is available all over the shop.

The invention thus is characterized by the fact that,  
10 all sensors and displays have one or a plurality of functions for reception or transmission via the information system, that receivers and transmitters transmits the current information via wire, IR, radio frequency wireless transmission or via the electrical power distribution net,  
15 that the system continuously supervises and compares the information presented at the displays with the information stored in the in-store computer and, at a discrepancy between these, alarm or a list of measures to take is given.

The invention will in the following sections be more closely described in adhesion to the attached drawings of which Figure 1 shows a complete information system incorporating a number of co-operative units, Figure 2 a display for price information and Figure 3 a display for  
25 temperature indication with the associated temperature sensor. In Figure 4. a principle outline of a connected terminal with monitor is shown where the localization of an item of merchandise searched for is shown.

In Figure 5 the principle connection of the set of shelves and the systems of set of shelves are shown which forms the condition precedent for the calculations of customer flows and the localization of items of merchandise in the saleroom among other things.  
30

35

The information system shown in Figure 1, is intended to be used in e.g. shops, stores or stock-rooms and in connection with or partly integrated in an already installed

In-Store Computer 1. with its Price Memory and a plurality of POS-Terminals (Point Of Sale). The Information System then incorporates a number of co-operative units as a Central Unit (CU), one or a plurality of Transmitters TX<sub>1</sub> - TX<sub>q</sub>, one or  
5 a plurality of Receivers RX<sub>1</sub> - RX<sub>p</sub>, one or a plurality of Section Controllers SC<sub>1</sub> - SC<sub>s</sub>, one or a plurality of Display Units PL<sub>1</sub> - PL<sub>n</sub> and TL<sub>1</sub> - TL<sub>r</sub>, one or a plurality of Customer Flow Counters CC<sub>1</sub> - CC<sub>t</sub>, one or a plurality of Shelf Edge Strips SES<sub>1</sub> - SES<sub>n</sub>, one or a plurality of Label Registrators  
10 LR<sub>1</sub> - LR<sub>n</sub>, a number of Sensors S<sub>1</sub> - S<sub>k</sub> of different sorts and one or a plurality of Monitor Terminals MT<sub>1</sub> - MT<sub>l</sub>.

The Central Unit (CU) can be connected to or be integrated in the In-Store Computer 1. and the Display Units  
15 can arranged in the Shelf Edge Strips or be integrated parts of Large Displays or Display Boards.

The Central Unit (CU) shall, ordered from the In-Store Computer refresh, check or request information on one or  
20 a plurality of the Display Units PL<sub>1</sub> - PL<sub>n</sub> or TL<sub>1</sub> - TL<sub>r</sub> in the saleroom. The Central Unit then transfers information to the Transmitters TX<sub>1</sub> - TX<sub>q</sub> which transfer the information to the Receivers RX<sub>1</sub> - RX<sub>p</sub>. These, in turn, transfer the information to their Display Units via wiring, Section Controllers and  
25 Shelf Edge Strips.

The Display Unit or Units, programmed with the product or display identity incorporated in the transmitted information refresh their information and then retransmit  
30 the now stored information via the wiring, the Section Controllers, Receivers and Transmitters to the Central Unit.

At the reception of this information the Central Unit performs a comparison with the newly transferred information  
35 or stores the received information dependant on what sort of display the answer is coming from. After the refreshing cycle is carried through the Central Unit informs the In-Store Computer about the result and possible measures to take

are stored in order to be printed in a list of "measures to take". To the retransmitted information is automatically added the information where in the sale- or stock-rooms the Display Unit or the Sensor is located as to shelf and set  
5 of shelves.

With the aid of the Label Registrators new and earlier used Display Units can be given a new product or temperature sensor identity.

10

The Central Unit (CU) is the unit that transfers information to and from the In-Store Computer. The data transfer goes via a standard series interface, a customer specified interface or, internally, via the data bus of the  
15 In-Store Computer when the Central Unit (CU) is incorporated in the In-Store Computer. The Central Unit also transfers information to the Label Registrators for programming of the Display Units and attends to the data transfer to the Transmitters.

20

At the refreshing procedure of the Display Units in a shop the Central Unit transfers information to one or a plurality of transmitters for further transfer of the information to the Receivers and further on to the Display  
25 Units. When a Display Unit has refreshed its information it sends back the stored information via wiring, Section Controller, Receiver and Transmitter for comparison. If a discrepancy exists between transmitted information and retransmitted this is stored for further notation on a list  
30 of "measures to take". The information retransmitted from a Display Unit is then added with the information of the physical localization of the Display Unit in the saleroom.

When a refreshing cycle has been completed where for  
35 some reason discrepancies exist between transmitted and retransferred information, a new attempt to refresh the failing displays is started. This is performed an eligible number of times whereupon the In-Store Computer is informed



of the result for notation on the list of "measures to take".

5 The Transmitters TX<sub>1</sub> - TX<sub>n</sub> receive the information from the Central Unit and transfer this to the Receivers. The connection between the Central Unit and the Transmitters is made by wire and the connection between the Transmitters and the Receivers is wireless or made by wire e.g. IR (infrared), RF (radio frequency) or via the power distribution net. The Transmitters can handle different sorts of messages from both the Receivers and the Display Units. The Transmitters are from a signal point of view translucent in both directions. The Transmitters as well as the Central Unit are power supplied from the power distribution net via an UPS (Uninterrupted Power Supply) in order to secure power at 15 power breakdowns.

20 The Receivers RX<sub>1</sub> - RX<sub>n</sub> receive information from the Transmitters and transfer this to the Display Units via the Section Controllers and the Shelf Edge Strips. The Receivers also can switch off the communication from the Transmitters in order to transfer the information received to the Section Controllers and the Display Units.

25 The information exchange between the Receivers and the Transmitters respectively Display Units or Sensors is in the form of messages so performed that they contain redundant information to facilitate for the Receiver to decide with high probability that a message has been correctly received.

30 At a certain type of message, so-called "request for localization", the Section Controllers are activated to monitor which Shelf Edge responds to the request. When a reply has reached the Receiver from a Display Unit or a Sensor, the Section Controller in question sends the information on set of shelf and shelf identity to the 35 Receiver which transfers this to the Central Unit.

The answer from the Display Unit to a request for

localization also incorporates information concerning the position of Unit in the Shelf Edge Strip in question. This can preferably be determined by a resistive determination of the position of a wiper and is used by the Central Unit  
5 for calculation of available space (volume) for item of merchandise in question which hereby can be matched to the size (volume) of the package for the item of merchandise.

The Receivers transmit respectively receive information  
10 from the Display Units via the Shelf Edge Strips  $SES_1 - SES_n$ .

The Display Units are supplied by power from the receivers via the Section Controllers, the wiring and the Shelf Edge Strips. The power supply could be either power  
15 from the power line or from batteries backed up by solar cells.

The mechanical design of the Receiver is in modular design to facilitate changes between alternative power  
20 supplies.

The Receivers are preferably so designed that they can order their Display Units to switch off their displays during e.g. the night.  
25

The Shelf Edge Strips  $SES_1 - SES_n$  serves as holders for the Display Units but also as wire bar and connector between these and the wiring of the set of shelves and incorporates also a resistance path for the determination of the position  
30 of a display.

The Shelf Edge Strips are, with the use of various attachments, adaptable to different types of shelf systems. It is also possible to change the attachment angle to suit  
35 different heights of the shelves. Furthermore the Shelf Edge Strip is designed in modular sizes to suit different shelf systems and sizes.

The Shelf Edge Strip incorporates a multiple conductor system which assures a reliable connection to Display Units as well as Sensors at the same time as it admits an  
5 independent positioning of these along the strip.

## P A T E N T   C L A I M S

1. An information and follow-up system preferably intended to display information in shops, stocks etc. including one or a plurality of sensors ( $S_1 - S_k$ ) and one or a plurality of information displays  $[(PL_1 - PL_n), (TL_1 - TL_r)$  and/or  $(MT_1 - MT_s)]$  which can be changed via connection to one or a plurality of receivers ( $RX_1 - RX_p$ ) which in turn are in wire or wireless connection with transmitters ( $TX_1 - TX_q$ ) which, initiated from a central unit (CU), are arranged to receive and transmit current information to all sensors and information displays, which all have one or more functions for reception and/or transmission of information and where receivers and transmitters transfer information *characterized* by a system which continuously supervises and compares the information shown at the displays with the information stored in the in-store computer (1) and where, at a discrepancy between the information presented and the information in the in-store computer, a list of measures to take is supplied.

2. A system according to claim 1 *characterized by* a procedure implying that, at a failure indicating response from a certain display unit, a new attempt to refresh the failing unit is performed after the on-going refreshment cycle and that the refreshment procedure is repeated a selected number of times whereupon directions for measures to take are given for the display unit in question.

3. A system according to claim 1 *characterized by* a procedure where, with a selected interval, a regular check of the information of the display units  $[(PL_1 - PL_n), (TL_1 - TL_r)]$  and the sensors ( $S_1 - S_k$ ) is performed and verified against the latest information transmitted from the in-store computer or against the alarm levels for gas, temperature, smoke from a fire or something similar, and, at the event of an incorrect or missing information or a level beyond the stated alarm level, directions for measures to take are given or alarm is given.

4. A system according to claim 1 *characterized by* the fact that the information displays ( $PL_1 - PL_n$ ) preferably consist of display units being an integral part of a price information system where the display units have been programmed with an article code and where the information shown is transferred to the in-store computer for check of correctness.

5. A system according to claim 1 *characterized by* the fact that the display units ( $TL_1 - TL_r$ ), preferably consisting of display units showing temperatures in deep-freezer boxes, freezers or boxes for storage of ready cooked hot food, are an integral part of the information system and have been given an identity consisting of an article number and for which all monitored data are logged in the central unit (CU).

6. A system according to claim 1 *characterized by* the fact that the information units ( $MT_1 - MT_n$ ) preferably consist of terminal monitors connected to the information system and arranged to, at an inquiry about a certain item of merchandise, show the localization of the item on a simple sketch-map of the saleroom and give information about the set of shelves and the shelf.

7. A system according to claim 1 *characterized by* the fact that the sensors ( $S_1 - S_k$ ), preferable consisting of sensors with integrated electronics for gas or smoke or of opto-electronic sensors for customer flow check, are integrated in the information system having an identity in the form of an article number and that collected data are logged for data handling or for check against programmed alarm levels.

8. A system according to claim 1 *characterized by* a design with a functional unit in the form of one or a plurality receivers ( $RX_1 - RX_p$ ) which are supervising and supplying power to numerous display units ( $PL_1 - PL_n$ ) and ( $TL_1 - TL_r$ ) and sensor units ( $S_1 - S_k$ ) brought together in or at a common installation of a shop.

9. A system according to claim 1 *characterized by* a design where the section controllers ( $SC_1 - SC_n$ ), positioned in each individual set of shelves, monitors and after response from an inquired article number (item of merchandise, temperature display or sensor) informs the central unit (CU) via the receivers ( $RX_1 - RX_n$ ) about the physical localization of the unit as to set of shelves, shelf and position in the shelf whereupon this information is stored in the central unit in the data base for article numbers.

10. A system according to the claims 4, 5 and 7 *characterized by* a design where the display units ( $PL_1 - PL_n$ ) and ( $TL_1 - TL_n$ ) as well as the sensors ( $S_1 - S_n$ ) have a short ledge-formed design which admits an optional location along the shelf edge strips ( $SES_1 - SES_n$ ).

11. A system where the display units ( $PL_1 - PL_n$ ) according to claim 4 are *characterized by* a design where the display has several fields for showing information and where the front side of the display unit is equipped with a label containing both a bar code symbol and information connected to the bar code.

12. A system where the information shown according to claim 11 is *characterized by* a design making it possible to display the information towards a coloured background and that one or several information fields can be shown pulsating in order to get increased attention.

13. A system according to claim 5 *characterized by* the fact that the temperature values monitored are data logged with time intervals which can be chosen via the software in the central unit (CU).

14. A system according to claims 5 and 13 *characterized by* the fact that monitored and data logged temperature values are printed on a suitable printer in order to make it possible to store the records during necessary time.

15. A system according to claims 5 and 13 *characterized by* the fact that supervision of each individual temperature sensor is performed against, by means of programming, chosen limits and that alarm is given when the alarm level has been crossed at two or more consecutive monitoring events with in the software chosen time interval.

16. A system according to claim 15 *characterized by* a design where alarm can be given via a modem connected to the central unit (CU) of the information system in order to alert a suitable alarm authority.

17. A device according to claim 10 *characterized by* a design of the shelf edge strips ( $SES_1 - SES_n$ ) admitting optional location of a display unit or a sensor unit and at the same time serving as wiring and connector arrangement for said display or sensor unit and which at the same time incorporates a resistance path making it possible to determine the position of said display or sensor unit.

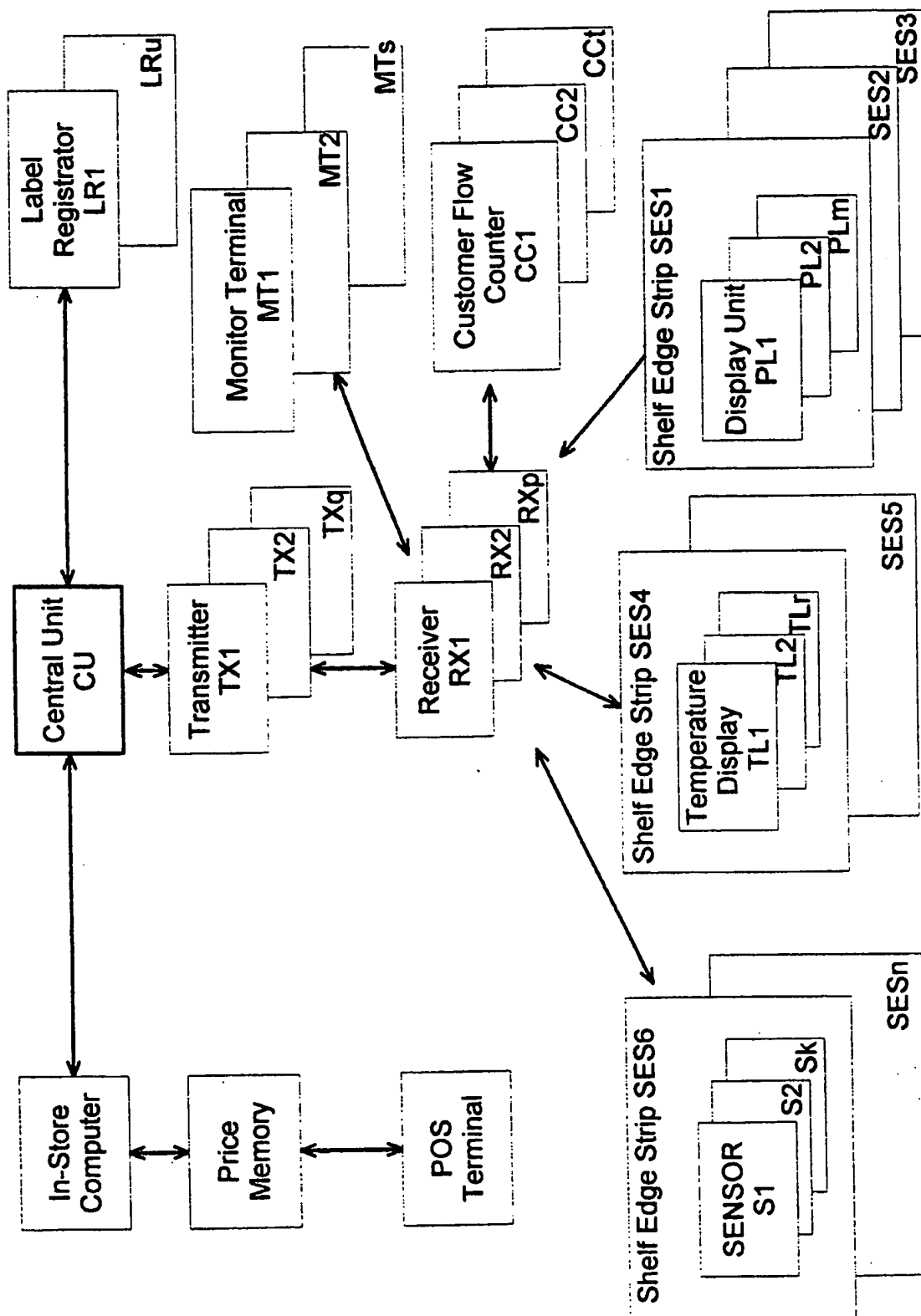


FIGURE 1



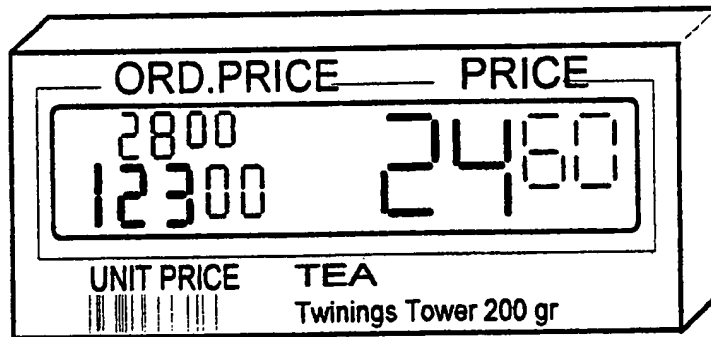


FIGURE 2

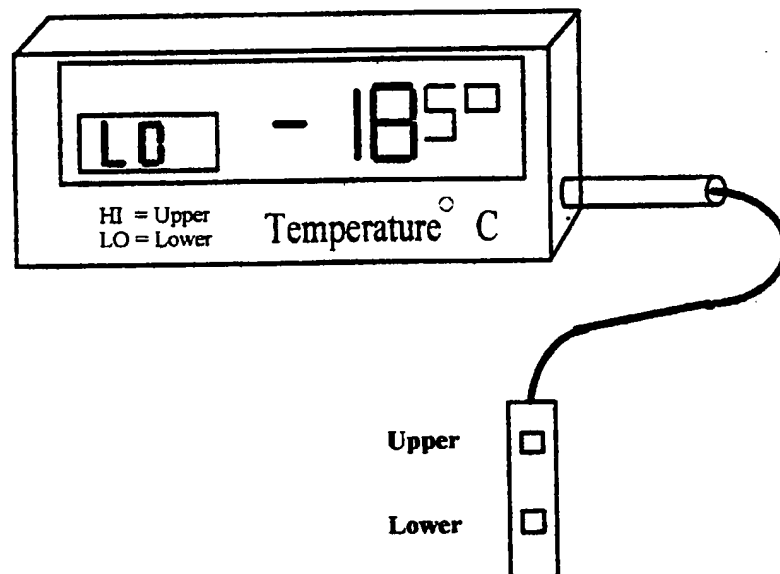
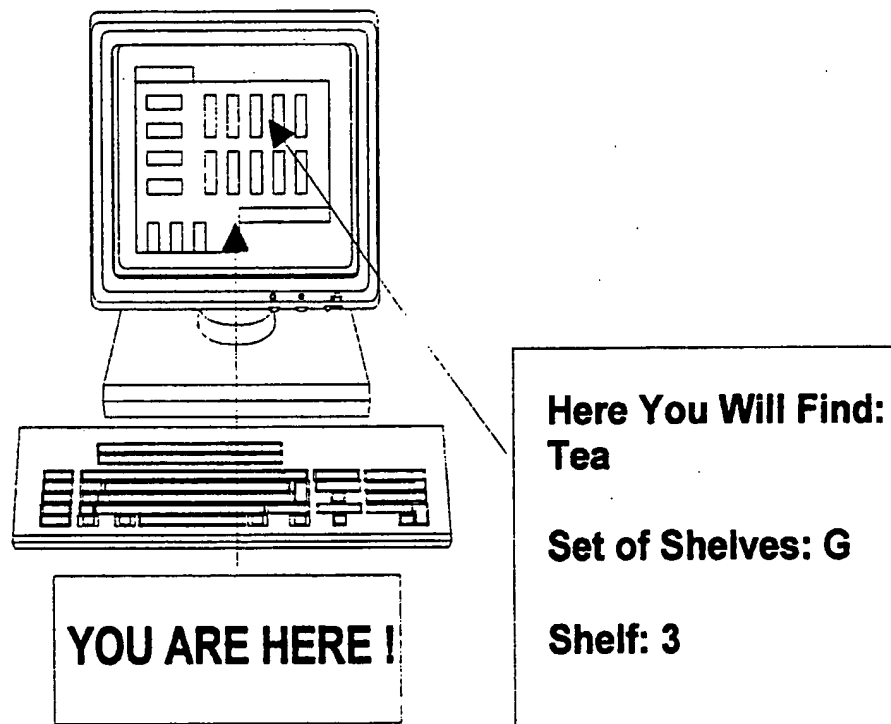


FIGURE 3



**FIGURE 4**

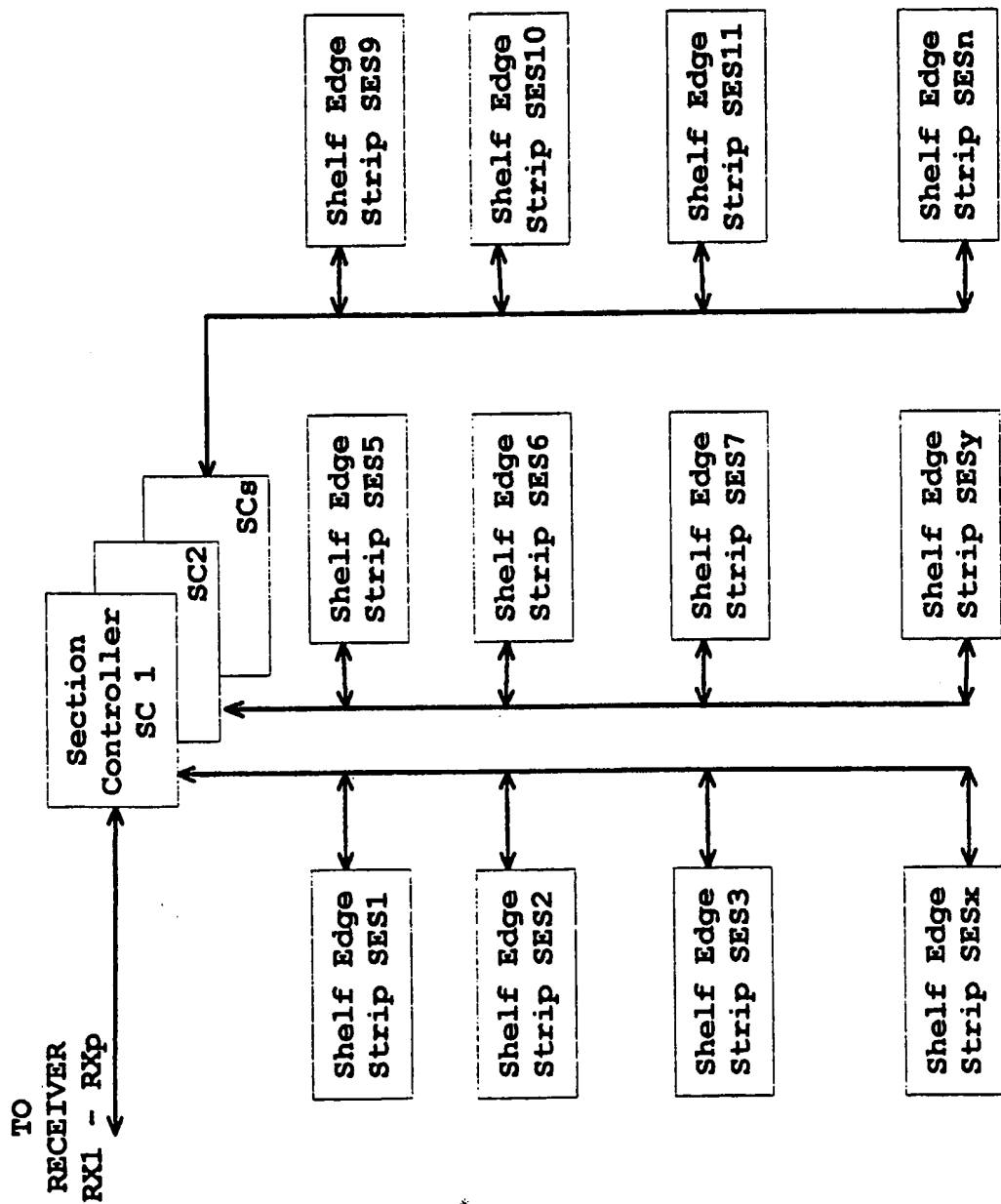


FIGURE 5

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 94/00269

## A. CLASSIFICATION OF SUBJECT MATTER

IPC5: G06F 15/21, G07G 1/14, A47F 10/02, G01K 1/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC5: G06F, G07G, A47F, G01K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP, A2, 0299355 (ZELLWEGER TELECOMMUNICATIONS AG), 18 January 1989 (18.01.89) --	1-17
A	WO, A1, 9216901 (ESEL A/S), 1 October 1992 (01.10.92) --	1-17
A,P	SE, B, 470113 (3I SYSTEMS AB), 8 November 1993 (08.11.93) -- -----	1-17

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

## \* Special categories of cited documents

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

\*&amp;\* document member of the same patent family

Date of the actual completion of the international search

17 June 1994

Date of mailing of the international search report

28.06.94

Name and mailing address of the ISA/  
Swedish Patent Office  
Box 5055, S-102 42 STOCKHOLM  
Facsimile No. +46 8 666 02 86

Authorized officer

Jan Silfverling  
Telephone No. +46 8 782 25 00

# INTERNATIONAL SEARCH REPORT

Information on patent family members

28/05/94

International application No.

PCT/SE 94/00269

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A2- 0299355	18/01/89	CH-A- 674275	15/05/90
WO-A1- 9216901	01/10/92	AU-A- 1451192	21/10/92
		EP-A- 0576532	05/01/94
SE-B- 470113	08/11/93	SE-A- 9201632	08/11/93